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Posted March 25, 2018 06:29 am - Updated March 27, 2018 10:58 am

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Juneau Empire

Seals and sulking salmon are causing a data problem for Fish & Game

Taku River sockeye and Chinook numbers have been overestimated by as much as 30 percent, Fish and Game says. But it might not matter. Just don't try telling that to a fisherman.

The Alaska Department of Fish and Game has a numbers problem. A statistical bias in the department's data on the Taku River — conducted via a "mark-recapture" system for decades — means it has been overestimating how many Chinook and sockeye salmon make it up the river to spawn by about 30-40 percent.

The statistical bias is now being corrected by new state-of-the-art studies, Fish and Game says, and much of the issue can be chalked up to seal predation. It also doesn't mean either of the stocks are any worse off than they have been, ADFG says.

But fishermen aren't buying it. They're concerned the bias could affect ongoing negotiations with Canada over who has the right to harvest sockeye — and how much of the resource each country is allowed. Both Canadians and Alaskans fish on the Taku River, which lies just a few miles south of Juneau.

ADFG and fishermen came to a head over the issue at a packed meeting in early March.

There, department coordinator Ed Jones said, he “agreed to take a beating” in the ongoing fish fight.

Jones would have fought back, he told the Empire, and defended the department’s methods. But the problem is, he said, the fishermen might be right — at least in part.

Sulking into a seal’s mouth

Sulking salmon and hungry seals — that’s what’s causing this whole problem, Jones explained Thursday during a visit to his office near Douglas Bridge. It has to do with the mechanics of how ADFG operates their mark-recapture program.

Fish and Game installs what they call “spaghetti tags” — cheap, orange markers — at Canyon Island, located in the lower Taku River, a few miles before the Canadian border. That’s the “mark” half of the mark-recapture system.

To corral passing salmon, ADFG uses what’s called a fish wheel. Propelled by the current, a series of buckets scoop salmon from the river and deposit them in a holding tank. The Canyon Island fish wheel has been in the same place since the 1950s, only, “It used to be wooden, now it’s aluminum,” Jones said.

The wheel turns 24 hours while in operation during the summer months. ADFG checks the holding tank every day, but not during the night, so sometimes fish are left in the tank overnight.

The problem, Jones says, is that staying in the holding tank can cause fish to become lethargic when released later on. Biologists refer to is as a “sulk rate,” and it leaves fish open to predation.

Seals in the Canyon Island area are taking advantage of this.

“What happens is we tag them and they’re a little lethargic due to the tagging procedure. It might take them a day, they might immediately turn and go up river — it might take a week — but right down river of Canyon Island there’s a big herd of seals that sit down there, so these fish sulk down in there and the seals eat them,” Jones said.

Normally, all of the fish tagged would be available for the second half of the study, the recapture portion. Fish are caught in the upper part of the river, sometimes by Canadian fishermen, who are supposed to turn in their tags to fishery managers.

Fish and Game discovered what was happening to their tagged fish after conducting a pair of state-of-the-art studies using what’s called radio telemetry. In those studies, fish were fitted with high-tech, $200 tags which the department uses to track a fish’s location.

What they found in those radio telemetry studies was that a portion of the tagged fish weren’t making it past the U.S.-Canada border.

“What we’ve done is we’ve put a project in the water to look at whether or not truly all of these fish that we’ve tagged are actually going up and entering the study, entering the population that we’re looking at. It’s a check of an assumption because you’re assuming that you tag these fish and they’re all available for recapture,” Jones said.

Fish and Game tags about 4,000-5,000 fish with spaghetti tags every summer. Each tag costs less than a dollar, so they can afford to do so. At $200 a pop, they can’t afford to do the same with radio telemetry tags. Last year was the second time the department has run a radio telemetry study on Taku sockeye.

“We put 277 radio tags on last year. And of those, 187 of those actually went above the border and entered the population. Roughly 32 percent of them didn’t make it into the population,” Jones said.

Because Fish and Game can’t afford to do full radio telemetry studies every year, what Jones said they plan on doing is to keep conducting the mark-recapture studies and use further radio telemetry to nail down exactly how many fish aren’t making it past the border.

Seals would pick off a small amount of these fish naturally, Jones said, which means they might not be overestimating by quite as much as the radio telemetry studies suggest. He estimates the amount of stunned fish lost to seals to actually be around 30 percent, not 32. He provided the Empire with a hypothetical chart detailing how the current data set might be adjusted to account for the seal predation.

It adjusts 131,282 sockeye — what the department thinks spawned last year — to 91,897.

It's a stark dip in spawning numbers, but in terms of the health of the run, this wouldn't mean much, Jones explained. He said the data adjustment really amounts to just going "from apples to oranges."

Jones said that Fish and Game manages sockeye populations based on what's called an escapement goal. It's a set number or range of returning fish biologists believe would allow a river system to maximize the amount of salmon it can sustainably yield.

Jones said escapement goals are, in part, based off mark-recapture data. So when one changes — in this case, gets dialed down something like 30 percent — the escapement goal changes as well, so the data adjustment doesn't mean sockeye runs are any less healthy than previously thought.

But Shelton and other fishermen say that's not quite right.

A March meeting

In early March, a group of about 40 commercial fishermen gathered in a packed room at the Thomas B. Stewart Legislative Office Building, a short walk over a sky bridge from the Alaska Capitol. Joining them were the Juneau delegation to the Alaska Legislature.

Many of them are longtime commercial gillnet fishermen working the Taku River. Most fish for chum salmon, which can be caught in droves near the mouth of the Taku Inlet. Others target sockeye, which don't return in nearly the same numbers as chum but are worth more on a per-pound basis.

Jev Shelton is one of those sockeye fishermen. He's concerned about ADFG's data flaws. What he's seeing on the Taku doesn't square with ADFG's data, he said.

A former statistics professor, Shelton and a few like-minded fishermen crunched their own numbers, eschewing the mark-recapture analysis for a "catch-based" method.

His analysis was based on ADFG's own data, he told the Empire in a series of interviews. Basically, Shelton said, the population of sockeye Fish and Game studied at the front of the river does not share the same demographics as the mark-recapture study, which means

one of them isn't correct. Imagine a population of spectators entering a sports stadium. They have an average age, come from different places and root for different teams. If the population that leaves the stadium hours later looks drastically different than the one that entered, something must have happened to change them.

In a nutshell, that's what Shelton found: Fish and Game's sampling of commercial catches on the Taku showed different demographics than their mark-recapture studies conducted further up the river system.

Shelton argues that something unnatural must have happened to create the discrepancy.

"We were basing what we did on the very good sampling that Fish and Game does weekly on the sockeye catches," Shelton said at the meeting. "We found that there was an overestimation from the mark-recapture every year for the 30 years we evaluated. Our medium average discrepancy was in the range of 30-32 percent. The escapement was overestimated routinely by that amount."

Jones and department Deputy Commissioner Charles Swanton were at that meeting and explained to the group that they had known about the problem and were working on fixes. A more technologically advanced study from 2017 had shown Jones, a science lead at the department, that their mark-recapture numbers were off by 31 percent, he said.

But they both Jones and Swanton were confident that changes to their data wouldn't affect the fishermen's wallets, so they found themselves in the position of defending their admittedly flawed mark-recapture work.

The fact was, though, Shelton was right, Jones said — at least in part.

"Jev is correct, there is strong evidence to suggest that there's something less than we're releasing that are available to be caught," Jones said.

Blame Canada?

When it comes to describing how Fish and Game plans to adjust their decades of data, Shelton doesn't have many words fit for print. He particularly bristles at the idea of adjusting down the escapement goal for the flaws in the mark-recapture data. He argues that what Jones and ADFG would do is a "fantasy" that allows them to massage their data to avoid drastic changes to their program.

Jones' 30 percent adjustment puts the new escapement goal at 38,000 fish — a big drop from the previous goal of 75,000. To Shelton, the Taku needs many more returning salmon to sustain run health.

“Adjusting a false number, an arbitrary number, doesn’t mean anything for what the system needs,” Shelton said. Instead, he thinks the department needs to do more science to establish a more accurate escapement goal.

Further, Shelton thinks the department’s biased data will leave Alaska fishermen in a weak position at the negotiating table in Pacific Salmon Treaty talks with Canada. Every 10 years, the U.S. sits down in talks with Canada and a few other Pacific Northwest states to carve up their shared salmon resources. Those talks are currently ongoing with a deadline to ratify the treaty set for Jan. 1 of next year.

If a shared river reaches its escapement goal, the surplus salmon are split in a ratio set by the Pacific Salmon Commission, which negotiates the treaty. Currently, the U.S. gets 82 percent of the surplus sockeye on the Taku while Canada gets the remaining 18 percent. But Shelton fears ADFG’s skewed data makes it look like the U.S. isn’t harvesting as much salmon as they’re allowed, leaving open the argument that Canada should be allowed to harvest the fish Alaska doesn’t.

Another longtime Taku Gilnetter, Jim Becker, aggrees.

“My thoughts are very similar to Jev’s,” Becker said. “We don’t want to go into another 10-year agreement with not accurate information.”

The flawed data, Shelton said, shows the U.S. has underharvested sockeye on the Taku by more than 300,000 fish from 2006-2016, while Canada had only underharvested by about 29,000 fish. But Shelton’s analysis, based on ADFG data, puts Alaska’s underharvest at only 19,074 fish during that time period. Canada, he believes, had actually overharvested by more than 50,782 salmon.

Treaty talks are currently ongoing and traditionally aren’t an easy bargain for Alaska to strike. Swanton is Alaska’s current representative to the Commission. Reached by phone after a tough week of negotiations, Swanton said he trusts Jones and the treaty’s other technical advisors, who are working with the best science available and aren’t avoiding problems with the ADFG data set.

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Nothing new there.the professor at it again!glad to hear he is alive.

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Val Angasan · Anchorage, Alaska

Shelton has been around for decades and every reason to believe him

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Jev, I can just hear, listen, to you and Happy Jack discussing fishing over a game of Crib during a few hour break. Jev does have a lot or merit in his ideas about the data. Some shacking up, human and organizational behavior changes need to occur on all sides. Great Job ! and Juneau Empire this is a great read/story.

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